

LynX

X-ray Detector Family

Acquire once. Slice and correlate freely later.

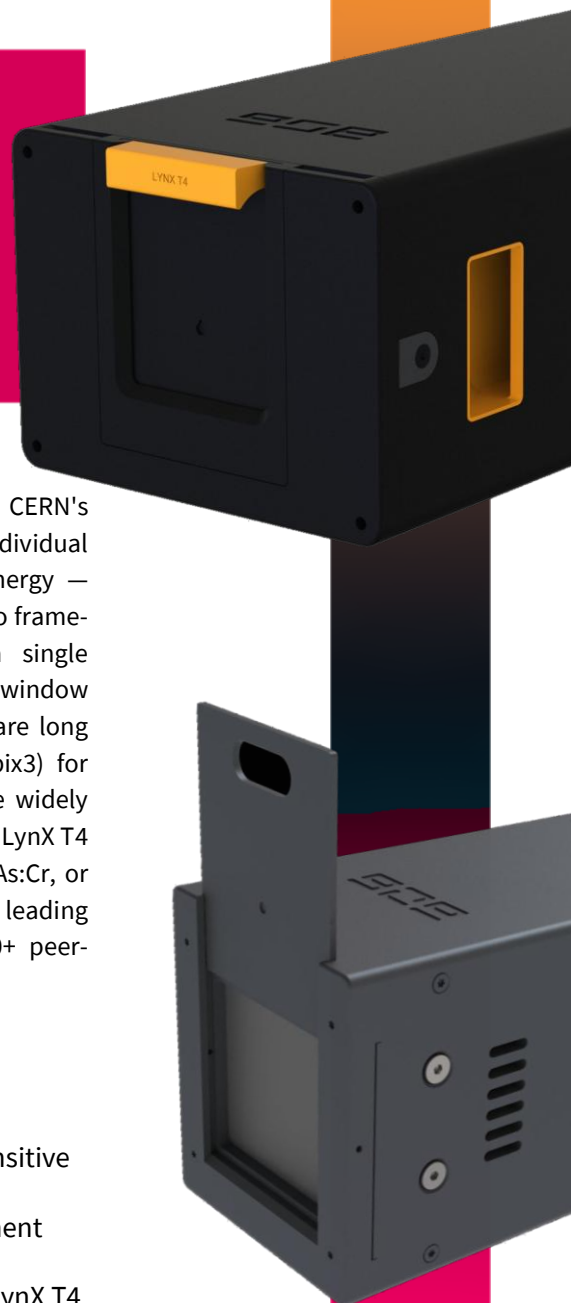
LynX records every photon's position, time, and energy — so you can re-window, re-threshold, and re-gate in software, long after beamtime ends.

Technology

LynX is ASI's hybrid-pixel X-ray detector platform, built on CERN's Timepix and Medipix chips. Every 55 μm pixel counts individual photons and records their position, arrival time, and energy — giving zero-noise, single-photon-sensitive detection with no frame-rate bottleneck. Because read-out is event-driven, a single exposure becomes a fully reprocessable photon stream: re-window the timing, re-threshold the energy, and re-gate in software long after beamtime ends. The family spans LynX M3 (Medipix3) for multi-threshold spectral imaging, LynX T3 (Timepix3), the widely deployed event-driven beamline standard, and the flagship LynX T4 (Timepix4) for sub-nanosecond timing — each with Si, GaAs:Cr, or CdTe sensors from tender to hard X-rays. LynX is proven at leading light sources — NSLS-II, MAX IV, APS, SPring-8 — in 50+ peer-reviewed publications.

General Features

- * Event-driven photon counting — zero-noise, single-photon sensitive
- * Per-photon Time-of-Arrival and energy (ToT) in one measurement
- * Nanosecond to sub-nanosecond timing — down to 195 ps on LynX T4
- * 55 μm pixels; Si, GaAs:Cr and CdTe sensors (tender to hard X-rays)
- * Reprocessable photon stream — re-window, re-threshold, re-gate offline



Specification

	LynX M3	LynX T3	LynX T4 ★
ASIC · readout	Medipix3 · SPIDR3	Timepix3 · SPIDR3	Timepix4 · SPIDR4
Chip format	256 × 256	256 × 256	448 × 512
Read-out	Frame-based	Event-driven	Event-driven
Max rate	up to 2,000 fps	up to 640 Mhits/s	up to 900 Mhits/s
Time resolution	frame-based	1.56 ns ToA	195 ps ToA
Per-photon energy	up to 8 thresholds	ToT per hit	ToT per hit

Form factor	Chip	Pixel array	Active area	Sensors
Single T4	Timepix4	448 × 512	24.6 × 28.2 mm ²	GaAs:Cr, CdTe, Si ★
Single	M3 / T3	256 × 256	14.1 × 14.1 mm ²	GaAs:Cr, CdTe, Si
Quad	M3 / T3	512 × 512	28.2 × 28.2 mm ²	Si, GaAs:Cr
Linea	M3 / T3	1024 × 256	56.3 × 14.1 mm ²	Si, GaAs:Cr
Ultra	M3 / T3	1024 × 512	56.3 × 28.2 mm ²	Si, GaAs:Cr

55 μm pixel pitch across the family · Si / GaAs:Cr / CdTe sensors, tender to hard X-rays · ★ LynX T4 Single shipping now

Applications in X-ray Science

* Synchrotron diffraction & coherent scattering

XPCS, ptychography and Bragg CDI, plus time-resolved and pump-probe diffraction with per-photon timing.

* Spectral & K-edge imaging (LynX M3)

Up to 8 energy thresholds per pixel for multi-K-edge imaging, harmonic rejection, and material contrast from one acquisition.

* Laboratory & Laue diffraction

Laue and pink-beam powder X-ray diffraction (PXRD) and demanding research diffractometry.

* Micro- & nano-CT

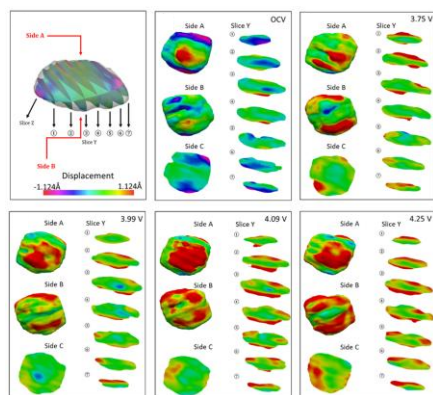
High-throughput tomography for materials characterisation, strain mapping, and industrial inspection.

* Time-resolved science (LynX T4)

Sub-nanosecond timing for fast dynamics, pump-probe experiments, and advanced XPCS.

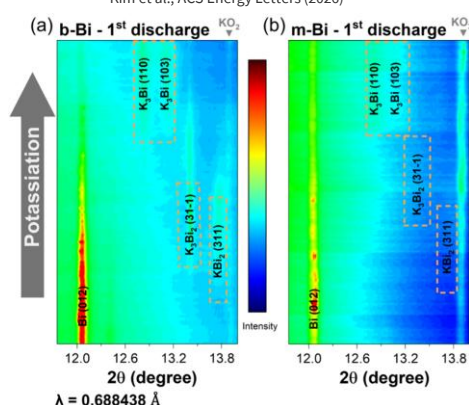
Origin of structural degradation in Li-rich layered oxide cathode

Liu et al., Nature (2022)



Size-Driven Kinetic Transitions and Strain Evolution in Bi Anode for K-Ion Batteries

Kim et al., ACS Energy Letters (2026)



AI-enabled high-resolution scanning coherent diffraction imaging

Cherukara et al., Appl. Phys. Lett. (2020)

